

**GROUNDWATER MONITORING REPORT  
FIRST QUARTER 2005**

**FOUR CORNERS FEED STORE  
LEAKING UNDERGROUND TANK SITE  
796 TODD ROAD  
SANTA ROSA**

*Prepared for:*

**Meta Property Management  
Santa Rosa, CA**

*Submitted to:*

**SONOMA COUNTY  
DEPARTMENT OF HEALTH SERVICES  
ENVIRONMENTAL HEALTH DIVISION  
Santa Rosa**

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## **ACKNOWLEDGMENTS**

This groundwater monitoring report was prepared under authorization of the Four Corners Feed Store property owner, Meta Property Management, Inc. The property owner representative is Mr. Joe Gasperdone; (510) 734-9730.

Site investigations at the Four Corners Feed Store site are under jurisdiction of Sonoma County Environmental Health Department, Environmental Health Division, 3273 Airway Drive, Suite D, Santa Rosa, California 95403. The site has been assigned to Mr. Cliff Ives, Senior Environmental Health Specialist; (707) 565-6565.

During the preparation of this report, reliance was made on observations and soil sampling data generated during previous underground tank removal and investigation activities completed at the site by others. Previous work performed at the site appears to be in conformance with accepted industry practice and standards.

This report was prepared by West & Associates Environmental Engineers, Inc. West & Associates is located at 630 Eubanks Court, Unit G, Vacaville, CA 95688; mailing address, PO Box 5891, Vacaville 95696; (707) 451-1360. Principal authors are Mr. Brennan Mahoney CPSS and Mr. Brian W. West PE. (Registered California Civil Engineer No. 32319 - expires 12/31/06).

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## **1.0 INTRODUCTION**

This report describes groundwater monitoring activities conducted during the first quarter of 2005 at the Four Corners Feed Store site, located at 796 Todd Road, in Santa Rosa. Groundwater monitoring activities are related to fuel leakage from former underground storage tanks.

In this Section, the project scope and objectives are described along with a presentation of selected background material.

This quarter a water sample was collected from the site tap water, supplied from an onsite groundwater well, for analysis.

### **1.1 Scope**

The scope of each monitoring event is summarized as follows:

- Check 3 monitoring wells for floating product
- Measure depth to groundwater in 3 monitoring wells
- Determine the groundwater gradient profile
- Purge and collect groundwater samples from 3 wells
- Analyze groundwater samples for contaminants of interest
- Prepare a written report of findings

Proper management of boring and sampling residues is also a part of the scope for this project.

### **1.2 Summarized Background**

The following site background information was adapted from "SITE AQUISITION ENVIRONMENTAL ASSESSMENT" dated April 25, 2001, prepared by SECOR International.

A retail fuel facility was present at the site from before 1956 until 1987. In 1987 two underground tanks, related piping and one fuel dispenser was removed. Soil sampling and analysis completed during the tank removal process indicated no significant environmental impact and the site was granted case closure.

In early 2001 SECOR International performed a soil and groundwater investigation at the site on behalf of a potential buyer. SECOR completed 5 soil borings with three borings being converted to groundwater monitoring wells. Soil contamination was found to be minor, however significant concentrations of both gasoline and diesel contamination were detected in one monitoring well (MW-2). SECOR concluded that "The lateral extent of TPHg and TEHd impact is not defined north, south, east or west of the former UST and dispenser island, the anticipated source of impact."

In early 2002 the Sonoma County Environmental Health Department re-opened the case. In mid 2002 the property was sold to Kimco Construction for potential development. In August 2002 Kimco Construction contracted with West & Associates Environmental Engineers, Inc. to conduct groundwater monitoring and potential site assessment activities.

West & Associates conducted a soils and groundwater investigation in December 2004.

## **2.0 SITE CHARACTERISTICS**

In this Section, physical site characteristics pertinent to the site investigation are presented.

### **2.1 Physical Setting**

The Four Corners Feed Store site is located in unincorporated Sonoma County south of Santa Rosa. The site is within the jurisdiction of the North Coast Region, Regional Water Quality Control Board. The Four Corners Feed Store site regional location is indicated on Figure 1, Appendix A.

Property usage in the site vicinity is predominantly rural residential in character. Interspersed among the rural residences are some schools, churches and small businesses. The immediate site area does not have sewer service. Wastewater disposal in the project vicinity is via on-site septic systems.

The property is approximately 2.5 acres in area. Development at the site consists of 5,500 ft<sup>2</sup> retail feed store building, and some outlying storage sheds. There is a 100 foot deep water well in the middle of the property which is used for a domestic water supply. Figure 2, presented in Appendix A, illustrates the existing site development.

Topography in the site vicinity is relatively flat with a slight slope to the south. Surface runoff from the Four Corners Feed store site travels west to Colgan Creek via open channel flow. Colgan Creek eventually confluent with the Russian River.

### **2.2 Subsurface Conditions**

Sub-surface conditions at the Four Corners Feed Store are relatively well known due to site investigation activities completed by SECOR in 2001 and by West & Associates in January 2005.

#### **2.2.1 Soil Characteristics**

The following information regarding soil conditions at the Four Corners Feed Store site is adapted from "SITE ACQUISITION ENVIRONMENTAL ASSESSMENT" dated April 25, 2001, prepared by SECOR International.

"The subsurface soils encountered during drilling consisted primarily of clays, silts and gravels with variable amounts of sand, to the maximum depth of exploration, approximately 50 feet bgs. The moisture content of the encountered soils was generally moist to wet. The clay and silt subsoils encountered were generally hard in consistency, while the gravels were generally very dense in consistency, based upon their blow counts." The boring logs prepared by SECOR are presented in the Appendix.

#### **2.2.2 Historical Groundwater Conditions**

The depth to first groundwater (DTGW) under the Four Corners Feed Store property was measured once in 2001 and twice in 2003. DTGW has been observed to vary from a low of 11.61 feet BGS (MW-3 on Nov. 18, 2003) to a high of 9.93 BGS (MW-2 on Jan. 21, 2001). Beginning in 2004, West & Associates began making systematic (quarterly depth to groundwater measurements).

In January 2001 SECOR calculated the groundwater gradient to be southeast at a rate of 0.001 feet per foot. SECOR noted that the measured gradient was not consistent with the reported regional direction (west). Gradient calculations made in 2003 and 2004 are consistent with the SECOR data from 2001.

### **2.3 Contaminant Profile**

Soil samples for chemical analysis have been collected from the Four Corners Feed Store site on four occasions:

- 1987: During the UST removal
- 1992: When the Stony Point/Todd road intersection was widened
- 1993: During a PG&E gas pipeline trenching project
- 2001: By SECOR
- 2005: By West & Associates

The soil samples collected during the tank removal project were reportedly all non-detect for contaminants of concern.

The soil samples collected during the road widening project and by PG&E were all relatively shallow and, for the most part, did not reveal any information regarding the magnitude and extent of contamination resulting from the UST leak. One soil sample collected during the road widening project at the former dispenser location was found to have significant concentrations of both gas and diesel contamination. As a consequence, a reported 200 yd<sup>3</sup> of contaminated soil was removed.

SECOR collected and analyzed a total of 13 soil samples from their five borings. Only two soil samples were found to contain detectable concentrations of contamination. Very low concentrations of toluene and total xylenes were found in sample SB-3, collected between 11 and 11.5 feet bgs. In sample SB-4, collected between 10.5 and 11 feet bgs, 205 PPM of TPH-gas and 21.6 PPM of TPH-diesel were detected.

SECOR collected groundwater samples from three monitoring wells on one occasion and also retrieved one groundwater sample from an open boring (SB-2). They also collected a groundwater sample for analysis from the on-site water well. Detectable concentrations of contamination were found in all three monitoring well samples. The highest concentrations were found in MW-2, sited in the former UST excavation. Groundwater sample MW-2 contained 5,770 PPB TPH-gas and 223 PPB TPH-diesel. No benzene was detected in any groundwater sample, although other aromatic hydrocarbon compounds were found in all three samples. MTBE was found only in sample MW-3 at the low concentration of 2.01 PPB.

Results of subsurface site investigation activities conducted in December of 2004 by West & Associates confirmed that a significant soil contamination plume does not appear to be present below the site.

### 3.0 HYDROLOGIC DATA

This section presents hydrologic data collected by West & Associates on March 24, 2005.

Depth to groundwater (DTGW) was measured in monitoring wells MW-1, MW-2 and MW-3 using a Solinst electronic sounding meter with a measurement accuracy of +/- 0.01 feet.

Tables 1 through 4 present top of casing (TOC) elevations, (DTGW) measurements and groundwater (GW) elevations.

Figure 3 presented in Appendix A, presents groundwater contours under the site extrapolated from data collected at the time groundwater monitoring was conducted.

The groundwater flow direction was calculated to be toward the northwest on March 24, 2005. This flow direction is 180° different compared to the last measurement conducted in December of 2004.

The groundwater gradient was calculated to be 0.004 ft/ft or 21 ft/mi.

**TABLE 1 - HYDROLOGIC MEASUREMENTS  
FOUR CORNERS FEED STORE**

March 24, 2005  
(All measurements in feet)

WELL ID	TOC	DTGW	GWE	CHANGE <sup>1</sup>
MW-1	100.36	3.37	96.99	+7.42
MW-2	100.00	3.77	96.23	+5.90
MW-3	100.73	3.85	96.88	+7.27

#### **ABBREVIATIONS**

**TOC:** Top of Casing Elevations Are Relative Values Adopted From the April 25, 2001 Site Acquisition Environmental Assessment Report prepared by SECOR International Incorporated.

**DTGW:** Depth to Groundwater

**GWE:** Groundwater Elevation

**ND:** Not Determined

**NA:** Not Available

<sup>1</sup>: Relative to last available DTGW measurement, December 6, 2004

### 4.0 GROUNDWATER SAMPLING

Groundwater monitoring well purging and sampling activities were conducted on March 24, 2005.

Before disturbing a well by introduction of downhole purging/bailing equipment the depth to groundwater (DTGW) was measured with an electronic sounding tape. The DTGW in each well was measured to an accuracy of 0.01 feet.

Each well was then checked for the presence of free product by bailing a surface water sample with a bailer suitable for the capture of floating hydrocarbons. No floating product was detected in any of the groundwater monitoring wells. No floating product has been observed in any Jenner "C" Store wells on previous monitoring occasions.

Each monitoring well was purged prior to being sampled. Well purging was accomplished utilizing an electric submersible pump.

Each well was purged until a minimum of 3 to 5 well volumes had been removed and groundwater parameters (temperature, pH and conductivity) were observed to stabilize. Groundwater purging data was recorded on purge data forms which are presented in Appendix B.

Monitoring well purge water was stored on site in a labeled 55 gallon drum pending receipt of analytical results and arrangements for proper disposal.

Following purging activities, each well was allowed to recharge to 80% of its original static level before sampling. Groundwater samples were collected utilizing new, disposable, plastic bailers. Bailers were slowly lowered into the groundwater column until approximately half submerged.

Upon retrieval to the surface, each water sample was immediately transferred to laboratory supplied sample containers. All water samples were labeled, placed into an ice-chilled cooler and transported under EPA chain-of-custody protocol to a DHS certified analytical laboratory for testing.

A water sample from the onsite groundwater supply well was collected this quarter. The sample was collected by filling a container from an outdoor hose bib type tap.

#### **4.1 Groundwater Sample Analysis**

All groundwater samples were submitted under chain of custody protocol to Excelchem Environmental Labs (EEL) located in Roseville, California. EEL is certified by the California Department of Health Services for the analyses performed.

Each groundwater sample was analyzed for the following:

- **Total Petroleum Hydrocarbons as gasoline (TPH-g)**  
by modified EPA method 8015
- **Total Petroleum Hydrocarbons as gasoline (TPH-d)**  
by modified EPA method 8015
- **Benzene, Toluene, Ethylbenzene, and Total Xylenes (BTEX)**  
by EPA method 602/8020
- **MTBE**  
by EPA method 8260B

Laboratory detection limits for groundwater samples are presented on the laboratory data sheets presented in Appendix C.



## 4.2 Groundwater Sample Analytical Results

Groundwater sample analytical results are presented in Table 2. Copies of original laboratory data sheets and chain of custody record are presented in Appendix C.

A summary of historical groundwater analytical results are presented in Table 3.

**TABLE 2**  
**GROUNDWATER SAMPLE ANALYSIS RESULTS**  
**FOUR CORNERS FEED STORE**  
**March 24, 2005**  
**All Hydrocarbon Values in ug/l (PPB)**

WELL ID	TPH (GAS)	TPH (DIESEL)	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES	MTBE
MW-1	ND	ND	ND	ND	ND	ND	ND
MW-2	750	370*	ND	0.6	4.4	89	ND
MW-3	ND	ND	ND	ND	ND	ND	ND
TAP	ND	ND	ND	ND	ND	ND	ND

### **ABBREVIATIONS**

**TPH:** Total Petroleum Hydrocarbons

**ug/l:** Micrograms per liter

**ND:** Not Detected (See Appendix C for minimum detection limits)

**NA:** Not Analyzed

**\*:** The sample chromatogram does not match the standard diesel chromatogram.

**TABLE 3**  
**SUMMARY OF HISTORICAL GROUNDWATER SAMPLE ANALYSIS RESULTS**  
**FOUR CORNERS FEED STORE**  
**August 2003 to Present**  
**All Hydrocarbon Values in ug/l (PPB)**

**MONITORING WELL MW-1**

DATE	GWE	TPH (GAS)	TPH (DIESEL)	BENZENE	TOLUENE	ETHYL- BENZENE	TOTAL XYLENES	MTBE
8/6/03	NA	NA	NA	NA	NA	NA	NA	NA
9/17/03	89.63	ND	ND	ND	ND	ND	ND	ND
11/18/03	89.12	ND	ND	ND	ND	ND	ND	ND
4/29/04	93.13	ND	ND	ND	ND	ND	ND	ND
12/6/04	89.57	ND	ND	ND	ND	ND	ND	ND
3/24/05	96.99	ND	ND	ND	ND	ND	ND	ND

**TABLE 3 (cont'd)**  
**MONITORING WELL MW-2**

DATE	GWE	TPH (GAS)	TPH (DIESEL )	BENZENE	TOLUENE	ETHYL- BENZENE	TOTAL XYLENES	MTBE
8/6/03	90.51	ND	NA	ND	ND	ND	ND	NA
9/17/03	89.77	ND	ND	ND	ND	ND	ND	ND
11/18/03	89.33	ND	ND	ND	ND	ND	ND	ND
4/29/04	93.05	580	NA	7.9	ND	2.0	22	ND
12/6/04	90.33	ND	ND	ND	ND	ND	ND	ND
3/24/05	96.23	750	370*	ND	0.6	4.4	89	ND

**TABLE 3 (cont'd)**  
**MONITORING WELL MW-3**

<b>DATE</b>	<b>GWE</b>	<b>TPH (GAS)</b>	<b>TPH (DIESEL)</b>	<b>BENZENE</b>	<b>TOLUENE</b>	<b>ETHYL- BENZENE</b>	<b>TOTAL XYLENES</b>	<b>MTBE</b>
<b>8/6/03</b>	NA	NA	NA	NA	NA	NA	NA	NA
<b>9/17/03</b>	89.59	ND	ND	ND	ND	ND	ND	ND
<b>11/18/03</b>	89.12	ND	ND	ND	ND	ND	ND	ND
<b>4/29/04</b>	93.17	ND	ND	ND	ND	ND	ND	ND
<b>12/6/04</b>	89.61	ND	ND	ND	ND	ND	ND	ND
<b>3/24/05</b>	96.88	ND	ND	ND	ND	ND	ND	ND

**ABBREVIATIONS**

**GWE:** Groundwater Elevation

**TPH:** Total Petroleum Hydrocarbons

**ug/l:** Micrograms per liter

**ND:** Not Detected (See Appendix C for minimum detection limits)

**NA:** Not Analyzed

**\*:** The sample chromatogram does not match the standard diesel chromatogram.

## 5.0 SUMMARY AND DISCUSSION

In this section recent groundwater monitoring results are summarized.

- Groundwater sampling activities were conducted on March 24, 2005.
- No floating product was observed in any groundwater well the quarter. This was consistent with previous findings.
- TPH-g, Diesel, BTEX and MTBE were not detected in wells MW-1 and MW-3 this quarter.
- Detectable concentrations of TPHg (750 ppb), TPHd (370 ppb), toluene (0.6 ppb), ethylbenzene (4.4 ppb) and xylenes (89 ppb) were detected in MW-2 this quarter. Neither benzene nor MTBE were detected above laboratory detection limits in MW-2 this quarter.
- The groundwater elevation below the site was approximately 7 feet higher on March 24, 2005 as compared to the prior measurement date, December 6, 2004.
- It appears that contaminant concentrations in MW-2 fluctuate seasonally with changes in groundwater elevation. At times when the groundwater elevation in MW-2 has been below approximately 91.0 feet MSL no contamination was detected in the well. Contamination has been detectable on two occasions when the groundwater elevation was above approximately 93.0 feet MSL in MW-2.
- Historically, contamination has not been detected in wells MW-1 or MW-3.
- The groundwater flow direction was calculated to be toward the northwest on March 24, 2005. This flow direction is 180° different compared to the last measurement date, December 6, 2004.
- No contaminants were detected above laboratory detection limits in the water sample collected from the onsite groundwater supply well.

# **APPENDIX A**

## **FIGURES**

**APPENDIX B**

**GROUNDWATER PURGE DATA FORMS**

**GROUNDWATER SAMPLING  
PURGE DATA FORM**

PROJECT: Four Corners

PROJECT LOCATION: 796 Todd Road

MONITORING WELL ID: MW-1 SAMPLER: WT

MONITORING WELL LOCATION: SOUTH OF STORE BUILDING

DATE: 3/24/05 TIME: 12:26 AM ☒ PM

DISSOLVED OXYGEN CONCENTRATION: \_\_\_\_\_ Mg/L - BEFORE

\_\_\_\_\_ Mg/L - AFTER

FLOATING PRODUCT: Y ☒ N

PETROLEUM SHEEN: Y ☒ N

ODOR/APPEARANCE: Silty (Muddy Color) Clear – No Odor

$$\frac{18'}{\text{WELL DEPTH}} \times \frac{3.37}{\text{DTGW}} \times \frac{2''}{.17} \times \frac{4''}{.66} = \frac{2.4}{\text{WELL VOLUME (GALS)}}$$

**PURGE MEASUREMENTS**

TIME	PURGE VOLUME GALLONS	CUMULATIVE GALLONS	TEMP. °F	CONDUCTIVITY μSx10	pH
12:26	2	2	63.7	354	8.88
12:28	2	4	61.4	360	8.74
12:30	2	6	60.8	352	8.71
12:32	2	8	60.4	355	8.71
12:33	2	10	60.4	355	8.66

REMARKS: Sample Collected @ 12:40pm

**GROUNDWATER SAMPLING  
PURGE DATA FORM**

PROJECT: Four Corners

PROJECT LOCATION: 796 Todd Road

MONITORING WELL ID: MW-2 SAMPLER: WT

MONITORING WELL LOCATION: NORTHWEST OF STORE BUILDING

DATE: 3/24/05 TIME: 1:12 AM ☒ PM

DISSOLVED OXYGEN CONCENTRATION: \_\_\_\_\_ Mg/L - BEFORE

\_\_\_\_\_ Mg/L - AFTER

FLOATING PRODUCT: Y ☒ N

PETROLEUM SHEEN: Y ☒ N

ODOR/APPEARANCE: Silty – No Apparent Odor

$$\frac{20'}{WELL\ DEPTH} \times \frac{3.37}{DTGW} \times \frac{2''}{.17} \times \frac{4''}{.66} = \frac{2.75}{WELL\ VOLUME\ (GALS)}$$

**PURGE MEASUREMENTS**

TIME	PURGE VOLUME GALLONS	CUMULATIVE GALLONS	TEMP. °F	CONDUCTIVITY μSx10	pH
1:12	0	0	61.4	252	9.13
1:13	2	2	59.6	240	9.08
1:14	2	4	59.4	239	9.04
1:15	2	6	59.4	236	9.00
1:16	2	8	59.4	235	9.00
1:17	2	10	59.3	239	8.98
1:19	2	12	59.3	239	8.97

REMARKS: Sample Collected @ 1:28pm



**GROUNDWATER SAMPLING  
PURGE DATA FORM**

PROJECT: Four Corners

PROJECT LOCATION: 796 Todd Road

MONITORING WELL ID: MW-3 SAMPLER: WT

MONITORING WELL LOCATION: EAST OF STORE BUILDING

DATE: 3/24/05 TIME: 12:50 AM ☒ PM

DISSOLVED OXYGEN CONCENTRATION: \_\_\_\_\_ Mg/L - BEFORE

\_\_\_\_\_ Mg/L - AFTER

FLOATING PRODUCT: Y ☒ N

PETROLEUM SHEEN: Y ☒ N

ODOR/APPEARANCE: Silty - Clear - Slight Odor

$$\frac{18'}{\text{WELL DEPTH}} \times \frac{3.85}{\text{DTGW}} \times \frac{2''}{.17} \times \frac{4''}{.66} = \frac{2.4}{\text{WELL VOLUME (GALS)}}$$

**PURGE MEASUREMENTS**

TIME	PURGE VOLUME GALLONS	CUMULATIVE GALLONS	TEMP. °F	CONDUCTIVITY μSx10	pH
12:50	0	0	68.3	694	9.14
12:52	2	2	65.7	694	9.06
12:54	2	4	64.4	681	9.04
12:55	2	6	63.6	681	9.01
12:56	2	8	63.7	679	8.97
12:57	2	10	63.4	680	8.92

REMARKS: Sample Collected @ 1:03pm

**APPENDIX C**

**CHAIN OF CUSTODY**  
**&**  
**LABORATORY CHEMICAL ANALYSIS RESULTS**